

Comparison of in vivo and in vitro properties of cyclic adenosine 3':5' monophosphate phosphodiesterase of amphibian oocytes

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The cAMP levels of single *Xenopus laevis* oocytes are shown to range from 1 to 4 μ M and those of isolated nuclei to be about 7 to 10 μ M. The oocyte is capable of hydrolyzing a large molar excess of microinjected cAMP, rapidly returning to basal levels, and forming 5'-AMP as the main product.

Using the microinjection method, a comparison was made of the properties of the in situ cAMP phosphodiesterase and that assayed by conventional methods in vitro. The in vivo and in vitro measurements give nearly identical values for apparent $K(m)$ (5 to 7 $\times 10^{-6}$ M), maximal velocity (20 to 25 pmol/min/oocyte), and inhibition by theophylline. Neither assay was affected by the addition of cGMP, except when added at very high concentrations in vitro. Hydrolysis of labeled cGMP was not observed after microinjection of this cyclic nucleotide, but hydrolysis was seen with the crude homogenate of oocytes. It is suggested that the activity toward cGMP is masked in the intact cell.

Approximately 70% of the in